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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/089,315
Filing Date: August 29, 2002
Appellant(s): CALL, EDWIN YOUNG

Robert G. Weilacher
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed June 15, 2005 appealing from the Office Action mailed October 28, 2004.

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(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

The examiner is not aware of any related appeals, interferences or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is correct.

(4) *Status of Amendments After Final*

The appellant's statement of the status of amendments after final rejection contained in the brief is incorrect.

The amendment after final rejection filed on March 7, 2005 has been entered, as stated by appellant. However, the claim that was amended was claim 13, not claim 7.

(5) *Summary of Claimed Subject Matter*

The summary of claimed subject matter contained in the brief is correct.

(6) *Grounds of Rejection to be Reviewed on Appeal*

The appellant's statement of the grounds of rejection is correct.

(7) *Claims Appendix*

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) *Evidence Relied Upon*

The following is a listing of the evidence (e.g., patents, publications, Official Notice, and admitted prior art) relied upon in the rejection of claims under appeal.

5,763,015	HASUI ET AL	6-1998
3,097,932	GOLDHEIM	7-1963
4,758,310	HATFIELD	3-1986

Kawahara, et al "The Application of Zn-Al Coatings to Prevent Corrosion of an Iron Boat", Thermal Spray: International Advances in Coatings Technology, Proceedings of the International Thermal Spray Conference, 28 May- 5 June 1992, 1992, pages 877-880.

(9) *Grounds of Rejection*

The following ground(s) of rejection are applicable to the appealed claims:

1. **Claims 1-2, 4, 6-7, 9-21 and 23-27 stand finally rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.** The

claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Independent claim 1 has been amended to require electric arc, twin wire thermal spraying wherein one wire is zinc and the second wire is "zinc or a zinc alloy". Similarly, independent claim 13 has been amended to require thermal spraying by an electric arc, twin wire system, with a first wire of zinc and a second wire of "zinc or zinc based alloy". These amendments are new matter. In the specification at page 7, lines 25-31, the only support for the specific process of electric arc, twin wire spraying is found. There it is stated that when using a two wire arc spraying system, one wire may be zinc when performing the two wire spraying and "the second wire can be zinc or copper, aluminum, tin, nickel or magnesium." Thus, the second wire is either all zinc or all one of the other listed metals. No teaching or suggestion of the use of a second wire of "zinc alloy" is provided when performing electric arc, twin wire spraying.

Independent claim 7 has also been amended to require electric arc, twin wire thermal spraying wherein one metal wire is "containing zinc" and a "second wire of zinc or zinc alloy". This is new matter. In the specification at page 7, lines 25-31, the only support for the specific process of electric arc, twin wire spraying is found. There it is stated that when using a two wire arc spraying system, "one wire may be zinc" when performing the two wire spraying and "the second wire can be zinc or copper, aluminum, tin, nickel or magnesium." Thus, the first wire is all zinc and the second

wire is either all zinc or all one of the other listed metals. No teaching or suggestion of a first wire "containing zinc" (and possibly other materials) or the use of a second wire of "zinc alloy" is provided when performing electric arc, twin wire spraying.

In claim 12 (which ultimately depends from claim 7), it is further claimed that the zinc metal coating can also contain an element from the group consisting of "copper, carbon, tin, nickel, aluminum, magnesium and mixtures thereof". However, at page 7, lines 25-31 of the specification, when performing the electric arc, twin wire spraying, the only other elements used in the coating process are "copper, aluminum, tin, nickel or magnesium." Thus, no support is present for the claimed use of "carbon" or "mixtures thereof".

In independent claim 19, it is now required that that "at least one wire is 100% zinc" when performing the electric arc, twin wire thermal spray process. However, there is no requirement as to the second wire. This is new matter. In the specification at page 7, lines 25-31, the only support for the specific process of electric arc, twin wire spraying is found. There it is stated that one wire may be zinc when performing the two wire spraying and "the second wire can be zinc or copper, aluminum, tin, nickel or magnesium." Thus, the second wire must be either all zinc or all one of the other listed metals. Furthermore, in claim 19, it is indicated that the zinc metal coating can also contain an element from the group consisting of "carbon, copper, tin, nickel, aluminum, magnesium and mixtures thereof". However, at page 7, lines 25-31 of the specification, when performing the electric arc, twin wire spraying, the only other elements used in

the coating process are "copper, aluminum, tin, nickel or magnesium." Thus, no support is present for the claimed use of "carbon" or "mixtures thereof".

In claim 27 (depending from claim 1), it is required that the "second wire is a zinc-copper alloy". This is new matter. In the specification at page 7, lines 25-31, the only support for the specific process of electric arc, twin wire spraying is found. There it is stated that when using a two wire arc spraying system, one wire may be zinc when performing the two wire spraying and "the second wire can be zinc or copper, aluminum, tin, nickel or magnesium." Thus, the second wire is either all zinc or all one of the other listed metals, such as copper. No teaching or suggestion of the use of a second wire of "zinc-copper alloy" is provided when performing electric arc, twin wire spraying.

The other dependent claims do not cure the defects of the claims from which they depend.

2. Claims 1-2, 4, 6-7, 9-21, 23 and 25-26 stand finally rejected under 35 U.S.C. 103(a) as being unpatentable over "The Application of Zn-Al Coatings to Prevent Corrosion of an Iron Boat" article (hereinafter Zn-Al article) in view of Hasui et al (US 5763015).

Zn-Al article teaches a method of protecting submerged or partially submerged marine surfaces, such as boat hulls. *Pages 877 and 880.* The protection method protects marine surfaces from bio-fouling without external electrical power. *See page*

878 ("corrosion test of sprayed coating" and "appearance" sections). The surface is directly metal sprayed with a zinc based alloy coating (Zn-Al) produced by a flame spraying (this would be a combustion wire spraying process, due to the "combustion" of gases to provide the flame for the flame spraying, by the operational definition of flame spraying) thermal spray process. *See page 877 ("spraying" section [a Zn-Al wire is used] and figure 2, and it is noted that flame spraying is an example of a "thermal" spraying process).* This provides a protective coating of the zinc based alloy on the surface to provide protection to the surface. *Pages 877 and 880.*

Claim 2: the coating is free of tributyltin (it is described as 87 % Zn and 13 % Al, and thus has no other material). *Page 877.*

Claims 4 and 20: the substrate can be steel. *Page 877.*

Claim 7: Zn-Al article teaches that the substrate is prepared for the flame spraying by degreasing, followed by blast cleaning with steel grit to remove rust and scale. *Page 877.*

Claim 10: a sealer on top of the flame sprayed, thermal spray coating is provided. *Page 877.*

Claims 11 and 19: Zn-Al article teaches that the coating can be 87% zinc, within the claims 50-100% range. *Page 877.*

Claims 12 and 19: Zn-Al article teaches that the coating can also contain aluminum. *Page 877.*

Claim 13: Zn-Al article also teaches a method for cathodically protecting surfaces of submerged or partially submerged metallic marine structures by thermally spraying by flame spraying, the surfaces with a zinc based alloy coating. *Pages 877 and 880 and see page 878 ("corrosion test of sprayed coating" section).*

Claim 14: the structure can be a hull of a ship. *Page 877.*

Claims 15, 16, 18 and 23: a marine structure submerged or partially submerged in water having been coated as described above with regards to claim 1 or 13 is provided. *See pages 877 and 880.*

Zn-Al article teaches all the features of these claims except (1) the electric arc, twin wire spraying, with one wire zinc and the other a zinc alloy *(claims 1, 7, 13, 19)*, (2) the specific substrate used *(claims 4, 6, 20, 21)*, (3) the specific washing and blasting process *(claim 7)*, (4) the multiple layers of thermal spraying *(claim 9)*, (5) that the amount of the zinc in the coating depends on the surfaces to be coated *(claims 11, 19)*, and (6) the propeller substrate *(claims 17, 25, 26)*.

However, Hasui teaches spraying a coating of zinc and aluminum onto a substrate. *Column 1, lines 1-15.* The applied coating can be used to protect a substrate against sea water. *Column 1, lines 1-30.* The spray coating can be formed on a substrate of steel, aluminum, zinc, a plastic, glass or wood. *See column 2, lines 20-35.* The substrate is spray coated using a two (twin) wire electric arc spraying system. *Column 3, line 50 through column 4, lines 25 (this is a form of "thermal" spraying as electric arc, twin wire spraying is an exemplary form of "thermal" spraying).* One wire can be zinc and the other

wire an alloy of zinc and aluminum. *Column 4, lines 5-25.* The amount of zinc vs. aluminum in the spray coating is based on the particular purpose or material of the substrate. *Column 4, lines 15-30.* For a steel substrate, for example, the percentage of zinc can be 50-90 %. *Column 4, lines 20-30.* After the spraying of the zinc/aluminum coating, a sealing treatment is carried out on the coating. *Column 4, lines 30-45.*

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Zn-Al article to (1) perform electric arc, twin wire thermal spraying, with one wire zinc and the other a zinc alloy as suggested by Hasui in order to provide a desirable coated surface to be sealed for protection, because Zn-Al article teaches protecting a marine article of iron based material by metal spraying a zinc alloy coating on the surface using a wire spraying process and then sealing the coating and Hasui teaches that a desirable way to protect a substrate from an environment such as sea water is by metal spraying using electric arc, twin wire spraying with one wire zinc and the other zinc/Al alloy and then sealing the coating. (2) It would further have been obvious to modify Zn-Al article to use a carbon steel or stainless steel substrate or a wood or plastic substrate as suggested by Hasui with an expectation of providing desirable protection to various surfaces, because Zn-Al article teaches that the substrate is a steel substrate with no limitation on the specific steel used, and it is the Examiner's position that carbon steel and stainless steels are well known forms of steel known to one of ordinary skill in the art, which would thus be included as desirable surfaces to be protected, and further, Hasui teaches that it is

desirable to protect wood and plastic substrates as well as steel substrates. (3) It would further have been obvious to modify Zn-Al article in view of Hasui to wash with water to remove soluble materials and blast the surface to white metal before thermal spraying with an expectation of producing a desirable coated article, because Zn-Al article teaches degreasing and grit blasting to remove rust and scale before thermal spraying, and it is the Examiner's position that it is well known in the art of degreasing and grit blasting before thermal spraying to degrease by washing in water to remove material on the substrate and to grit blast to white metal when removing rust and scale. (4) It would further have been obvious to modify Zn-Al article in view of Hasui to spray multiple layers to achieve the desired coating thickness with an expectation of achieving a desirable coated product, because Zn-Al article teaches spraying to a desired minimum thickness *(see page 878, top of 2nd column, -- it must be over 100 microns)* and it is the Examiner's position that coating multiple layers (i.e. multiple passes of the spray gun) is well known in the thermal spraying art in order to achieve the desired build up of thickness into the desired range. (5) It would further have been obvious to modify Zn-Al article to perform experimentation to optimize the amount of Zn in the coating based on the specific substrate to be used as suggested by Hasui so as to achieve the optimum final product protection, because Zn-Al article teaches a test of a specific example of Zn-Al, and further indicates *(at page 880)* that further investigation is to be performed, indicating the desire to optimize the specific coating used and Hasui teaches to select the amount of Zn in the coating based on the specific substrate to be used. (6)

It would further have been obvious to modify Zn-Al article in view of Hasui to apply the coating system to a propeller so as to produce a protected propeller, because Zn-Al article teaches a coating to prevent corrosion and fouling on a submerged marine boat, and propellers would be a well known marine surface that would be desirably protected from corrosion and fouling so as to prolong their useful economic life.

3. Claims 1-2, 4, 6, 10, 13-18, 24 and 26 stand finally rejected under 35 U.S.C. 103(a) as being unpatentable over Goldheim (US 3097932) in view of Hatfield (US 4578310).

Goldheim teaches a method of protecting submerged or partially submerged marine surfaces, such as boat hulls. *Column 1, lines 5-15.* The protection method protects marine surfaces from bio-fouling without external electrical power. *Column 1, lines 5-15 and column 2, lines 5-35.* The surface is directly sprayed with a zinc coating produced by a flame spraying (this would be either a combustion wire or powder process, due to the "combustion" of gases to provide the flame for the flame spraying, by the operational definition of flame spraying) thermal spray process. *Figure 1 and column 1, lines 35-45 (the first layer of zinc is applied directly to the surface, and it is noted that flame spraying is an example of a "thermal" spraying process).* This provides a protective coating of the zinc on the surface to provide protection to the surface. *Figure 1 and column 2, lines 25-35.*

Claim 2: the coating is free of tributyltin (it is all zinc). *Column 1, lines 40-50.*

Claim 4: Goldheim also teaches that the substrate can be steel. *Column 1, lines 15-20.*

Claim 6: the surface can be plastic or wood. *Column 1, lines 15-20.*

Claim 10: Goldheim teaches applying a sealer system on top of the thermal spray coating. *Figures 2-3 and column 45-55.*

Claim 13: Goldheim article also teaches a method for cathodically protecting surfaces of submerged or partially submerged metallic marine structures by thermally spraying the surfaces with a zinc based alloy coating. *Column 1, lines 35-45 and column 2, lines 5-35 (the application of the zinc based coating).*

Claim 14: the structure can be a hull of a ship. *Column 1, lines 5-15.*

Claims 15, 16 and 18: a marine structure submerged or partially submerged in water having been coated as described above with regards to claim 1 or 13 is provided. *See column 1, lines 5-15 and column 2, lines 5-35.*

Claim 24: the coating is 100 percent zinc. *Column 1, lines 40-50.*

Goldheim teaches all the features of these claims except (1) the electric arc, twin wire spraying, with both wires of zinc *(claims 1, 13)*, (2) the specific steel substrate *(claim 4)*, and (3) the propeller *(claims 17, 26)*.

However, Hatfield teaches that when applying a metal film of a material such as zinc, it is well known to use a twin wire electric arc spraying system, where two continuously fed zinc wires arc and melt. *Column 3, lines 5-20 (this is a form of "thermal" spraying, as electric arc, twin wire spraying is an exemplary form of "thermal" spraying).* As

well, such zinc coatings can also be applied by flame spraying. *Column 3, lines 5-20 (this is another form of "thermal" spraying, as flame spraying is also an exemplary form of "thermal" spraying).*

It would have been obvious to one of ordinary skill in the art at the time the invention was made to (1) modify Goldheim to use electric arc twin wire spraying, with both wires of zinc as suggested by Hatfield with an expectation of producing a desirable protected coated article, because Goldheim teaches flame spraying a zinc coating, and Hatfield teaches that when applying zinc coatings, either flame spraying or twin wire arc spraying with both wires of zinc are desirable application methods. (2) It would further have been obvious to modify Goldheim in view of Hatfeld to use a carbon steel or stainless steel substrate with an expectation of producing a desirable coated article, because Goldheim teaches that the substrate can be a steel substrate with no limitation on the specific steel used, and it is the Examiner's position that carbon steel and stainless steels are well known forms of steel known to one of ordinary skill in the art, and thus carbon and stainless steels would be included as desirable surfaces to be protected. (3) It would further have been obvious to modify Goldheim in view of Hatfield to apply the coating system to a propeller so as to produce a protected propeller, because Goldheim teaches a coating to prevent fouling of various marine surfaces *(see column 1, lines 5-15)*, and propellers would be a well known marine surface that would be desirable to protect from fouling so as to prolong their useful economic life.

(10) Response to Argument

1. The rejection of claims 1, 2, 4, 6, 7, 9-21 and 23-27 under 35 USC 112, 1st paragraph

Appellant's Arguments

Appellant argues that the application as a whole clearly describes zinc or zinc based alloys as the material which is applied to the surface to be protected. Appellant cites various parts of the specification which discuss the use of a zinc alloy wire or zinc alloy coatings (pages 7-8 of Appeal Brief). As a result of this description, according to appellant, it is clear that when the two wire electric arc spraying method is referred to, it means that at least one wire is zinc, and a second wire is such that the resultant coating is zinc or a zinc based alloy, and thus appellant argues, that the application complies with the written description requirement.

The Examiner's Response

The Examiner has reviewed appellant's arguments, however, the rejection is maintained. In the application, it is taught that the invention is directed to providing thermal sprayed zinc and zinc based alloys on surfaces to protect a marine substrate. See page 5, lines 1-5 and 20-30. At pages 6, line 25-page 7, line 5, a description of thermal spraying by various methods, including "electric arc" is described, whereby a single "zinc-based metal wire is selected" for spraying. That wire can be an alloy. However, use of this wire is not described with the use of a "twin wire" electric arc

system. At page 7, lines 29-31, the use of a two wire system is taught. With the use of this two wire system it is taught that "Thus, one of the wires may be zinc and the second wire can be zinc or copper, aluminum, tin, nickel or magnesium". There is no indication that with the use of two wires that a alloy wire is used, since all of the twin wire descriptions are of wires of a single material, which when sprayed together will form an alloy mix on the substrate as the coating. In fact, the description only provides that wires of a single material are used when electric arc spraying twin wire systems are used. In all of the citations by appellant, there is no teaching or description that would suggest that other than the specifically listed materials would be used when twin wire electric arc spraying. In the citations, for example, there is no indication of actually twin wire electric arc spraying where one of the wires is a zinc based alloy. Either the product alloy can be sprayed by one of the other possible thermal spraying methods listed at page 6, lines 25-30 or if twin wire electric arc spraying is used, all of the applied alloys can be formed by spraying of two wires that are each a single material. As a result, a reading of the disclosure as originally filed would not clearly convey the information that an applicant has invented the subject matter which is claimed. Even if the appellant's position that ". . . when the two wire electric arc spraying method is referred to in the application, it means that at least one wire is zinc and the second wire is such that the resultant coating is zinc or a zinc based alloy . . ." (page 8 of the Appeal Brief) is correct, it does not mean that the specification provides that the second wire

can be a zinc based alloy, because the "resultant coating" can be an alloy if the second wire is 100% of another material, such as aluminum.

2. The rejection of claims 1, 2, 4, 6, 7, 9-21, 23 and 25-26 under 35 USC 103 using Zn-Al Article in view of Hasui.

Appellant's Arguments

Appellant argues that Zn-Al article provides a method of protecting iron or steel structures in a marine environment, including the steps of checking the boat, then degreasing, then blast cleaning, then the application of a specific 87%Zn-13%Al coating, then a sealing step and then a painting step. Zn-Al article requires a protective coating applied to the Zn-Al coating, as shown on Table 1, page 2 of the article. The spray system is a flame spray system using Zn-Al wire. Appellant argues that their invention for protecting a submerged or partially submerged surface from biofouling and corrosion without external electrical power is carried out by directly spraying a surface with an electric arc, twin wire thermal spray process, wherein at least one wire is zinc to form a zinc or zinc alloy coating. Appellant argues that the electric arc, twin wire thermal spray process is not disclosed in the cited article and does not provide any suggestion, reason or motivation to make any changes. Furthermore, as to Hsaui, it teaches that prior to coating, a pretreatment with a primer is first applied, then a zinc-aluminum pseudo alloy is spray coated by a two wire arc system, then a sealing treatment is provided. In the present application, however, the zinc coating is applied

directly to the surface of the metal, excluding the use of a primer coating as in Hsaui. Moreover, according to appellant, there is no teaching, suggestion or motivation, in Hsaui that would lead a person skilled in the art to believe that any benefit or advantage could be obtained by use of the two wire electric arc process in place of the plasma coating of Zn-Al article.

Appellant further argues that as to the spraying of multiple layers (claim 9), there is nothing to suggest that multiple spraying applications would be superior to single applications. As to the amount of zinc in the coating (claims 11, 19), applicant argues that Zn-Al has no teaching of any specific coating other than the described zinc-aluminum wire and no teaching or suggestion of how the proportions are to be changed for optimum results. As to the coating of propellers (claims 17, 25, 26) arguments are also made (see discussion as to part 2(a)). As to the use of a second wire of zinc-copper (claim 27), appellant argues that this is not taught.

The Examiner's Response

The Examiner has reviewed appellant's arguments, however, the rejection is maintained. While Zn-Al article may teach a process with a series of steps of "checking the boat" (checking the substrate boat), then degreasing, then blast cleaning, then Zn-Al spraying, then sealing, then painting – none of these steps are prevented by appellant's invention as claimed. In fact, appellant also provides the steps of washing (which would provide degreasing) and then blasting and then spraying of a zinc alloy coating (see claim 7, for example, of the present application). Furthermore, after the spraying of

the zinc alloy coating, appellant also provides that a sealer coat can be deposited over the applied zinc alloy (see claim 10, for example, of the present application). Also in the Zn-Al article, it is not required to perform two protective steps, if sealing is applied (by use of a zinc-rich paint). (See Table 1, example 6 and Table 2, last two examples). While Zn-Al articles uses a single example of Zn-Al alloy (87% Zn, 13% Al), the use of an alloy of this makeup is not prevented by the claims. Furthermore, Zn-Al article teaches that the coating prevents biofouling and corrosion and works on submerged surfaces without external electrical power. See page 887. The only feature that Zn-Al article does not teach as to representative independent claim 1 is the use of electric arc, twin wire spraying.

The Examiner has cited Hasui as to the use of electric arc, twin wire spraying to provide a Zn-Al coating on a marine surface for protection. The coating can be applied directly to the surface of an article to be protected, since Hasui teaches that while the use of a primer coat is preferred, the coating can be applied directly to a blasted surface. See column 2, lines 30-45. While Hasui also provides a sealing treatment, this is not prevented by Zn-Al article (which also provides sealing, as discussed above) or by the claims of the present application (see claim 10 of the present application, for example, where a sealer is applied to the coated substrate). As to the combination of Zn-Al article with Hasui, while Zn-Al article teaches metal spraying by flame spraying, Hasui teaches that a desirable metal spraying method can be by electric arc twin wire spraying, which at the least would be expected to provide an equally desirable method

of spraying. Furthermore, the twin wire electric arc spraying also provides the benefit of rapid adjustment of the combination of wires, the diameter of the wires, or wire feeding, allowing improvement of the corrosion preventing property, for example. See Hasui, column 4, lines 15-30. As a result, it clearly would have been obvious to expect desirable benefits from using the electric arc twin wire spraying of Hasui in the process of Zn-Al article.

As to appellant's discussion of the features of claims 9, 11, 19 and 27, the Examiner notes that these arguments are to features of claims which are not indicated as being argued separately, as they are not placed under a separate subheading. However, for clarification, these arguments are addressed. As to the features of claim 9, it remains the Examiner's position that coating multiple layers (i.e. multiple passes of the spray gun) is well known in the thermal spraying art in order to achieve the desired build up of thickness into the desired range. Since Zn-Al article teaches to spray a desired thickness, it is the Examiner's position that it would have been obvious to one of ordinary skill in the art to apply multiple layers to get this desired thickness, with at least the expectation of achieving a desirably applied coating. As to the features of claims 9 and 11, it is the Examiner's position that Zn-Al article teaches that further investigation is to be performed, and Hasui clearly teaches that the ratio of zinc to aluminum changes based on the coating to be used (see Hasui, column 4, lines 15-25). These provide a clear indication to optimize the amount of Zn in the coating. As to the

features of claim 27, the Examiner notes that this claim is not rejected by Zn-Al article in view of Hasui.

2(a) The rejection of claims 17, 25 and 26 under 35 USC 103 using Zn-Al article in view of Hasui

Appellant's Arguments

Appellant argues that as to the use of a propeller substrate (as in claims 17, 25 and 26), the Zn-Al article does not disclose applying to a propeller, and that propellers in marine service are subjected to extremely severe conditions which make them particularly vulnerable to corrosion and fouling. Appellant argues that the invention has proven to be particularly suitable for protection of propellers. Appellant further argues that Hasui also does not mention propellers.

The Examiner's Response

The Examiner has reviewed appellant's remarks, however, the rejection is maintained. As to the application of the zinc coating onto a propeller as well as other marine parts, it is the Examiner's position that it would have been obvious to modify Zn-Al article in view of Hasui to apply the coating system to a propeller so as to produce a protected propeller, because Zn-Al article teaches a coating to prevent corrosion and fouling, and propellers would be a well known marine surface that would be desirable to protect from corrosion and fouling so as to prolong their useful economic life. The two references are concerned with applying zinc alloy coatings to

surfaces that will be submerged in sea water, and Zn-Al article indicates that the thermal sprayed coatings have greater adhesion than protective paints and prevent biofouling and reduce corrosion. Thus, the use on a propeller as well as other well known marine surfaces would be suggested, since it provides beneficial protection above known protective paint. As to the argument that propellers in marine service are subjected to extremely severe conditions which make them particularly vulnerable to corrosion and fouling, this knowledge would further suggest that they need the improved coating protection of Zn-Al article. As to the coatings being particularly suitable for protection of propellers, it is the Examiner's position that the coatings are suggested for use as discussed above. There is no indication that unexpected benefits above that on other surfaces are provided for propellers.

3. The rejection of claims 1, 2, 4, 6, 10, 13-18, 24 and 26 under 35 USC 103 using Goldheim in view of Hatfield.

Appellant's Arguments

Appellant argues that Goldheim teaches antifouling coatings for submerged marine objects, where a flame spray process is provided for depositing zinc and then an alloy of mercury and zinc is deposited on that coating to impregnate the pores of the zinc. No teaching of appellant's method of spraying using an electric arc, twin wire thermal spray process is provided. Hatfield is relied on to show the use of a twin wire system for application of a zinc coating. Appellant argues that Hatfield calls for

application of a primer coat to a polymeric surface followed by spraying the primer coated polymer with a thick metallic film, so as to improve radio shielding frequency. Hatfield is not concerned with protection of marine surfaces, and one skilled in the are searching for ways to reduce fouling or corrosion in a maritime environment would find no solution to the problem within the four corners of Hatfield, and thus the two references do not create a prima facie case of obviousness.

Appellant further argues that Goldheim further has no disclosure of the special problems dealing with protection of propellers.

The Examiner's Response

The Examiner has reviewed appellant's arguments, however, the rejection is maintained. Goldheim teaches protecting submerged marine surfaces from bio-fouling without external electrical power, as claimed by appellant. Goldheim further provides directly spraying a surface with a zinc coating produced by flame spraying. Then sealer coats are provided. The use of sealer coats are allowed by appellant's application (see claim 10 of the present application, for example). The only feature that Goldheim does not teach as to representative independent claim 1 is the use of electric arc, twin wire spraying.

The Examiner has cited Hatfield as to the obviousness of using either a flame spraying method (the oxy-acetylene spraying) or an electric arc, twin wire spraying method to provide a zinc coating on a surface as discussed at column 3, lines 5-20 of Hatfield. While Hatfield is not concerned with spraying zinc coatings on a marine

surface for protection of the substrate, the primary reference to Goldheim is provided as to this use. It has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Hatfield is reasonably pertinent to the particular problem with which applicant was concerned, the spraying of zinc coatings onto a surface. Hatfield provides that it is desirable to spray apply zinc coatings by either electric arc twin wire spray or by flame spraying, and thus at the least, one of ordinary skill in the art would expect desirable metal application from either method. Thus, when Goldheim and Hatfield are combined, it would have been obvious to one of ordinary skill in the art to modify Goldheim to use electric arc twin wire spraying, with both wires of zinc as suggested by Hatfield with an expectation of producing a desirable coated article, because Goldheim teaches flame spraying a zinc coating, and Hatfield teaches that when applying zinc coatings, either flame spraying or twin wire arc spraying with both wires of zinc are desirable application methods.

As to appellant's discussion of the propeller features of claims 17, 25 and 26, the Examiner notes that these arguments are to features of claims which are not indicated as being argued separately, as they are not placed under a separate subheading. However, for clarification, it is the Examiner's position that it would have been obvious to modify Goldheim in view of Hatfield to apply the coating system to a propeller so as

to produce a protected propeller, because Goldheim article teaches a coating to prevent fouling of various marine surfaces, and propellers would be a well known marine surface that would be desirable to protect from corrosion and fouling so as to prolong their useful economic life. Goldheim is concerned with applying zinc alloy coatings to various surfaces that will be submerged in sea water, and Goldheim indicates that the thermal sprayed coatings have better protection against bio-fouling than protective paints (column 2, lines 5-35). Thus, the use on a propeller as well as other well known marine surfaces would be suggested, since it provides beneficial protection above known protective paint. As to the argument that propellers in marine service are subjected to extremely severe conditions which make them particularly vulnerable to corrosion and fouling, this knowledge would further suggest that they need the improved coating protection of Goldheim. There is no indication that unexpected benefits above that on other surfaces are provided for propellers.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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PRIMARY EXAMINER

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